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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,673	05/16/2001	Kazuyoshi Irie	503.36712VX1	2143

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ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-9889

EXAMINER

KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 03/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/855,673	Applicant(s) IRIE ET AL.	
	Examiner Kevin P. Kerns	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☒ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2001 and 17 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

JR

DETAILED ACTION

Claim Objections

1. Claim 22 is objected to because of the following informalities: in the 2nd line, "a" should be added before "semiconductor". Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3-8, 15, 16, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591).

Rossin et al. teach a method of processing perfluoride compounds in which a gas

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stream containing the perfluoride compounds from a semiconductor process contacts a hot catalyst that is heated to a desired processing temperature. Rossin et al. teach that the catalyst may be in the form of pellets, granules, or cylinders. Rossin et al. also teach that the temperature of the catalyst may be controlled and that air and water may be mixed with the gas flow before contacting this gas with the catalyst. An acid removal step, through a means such as a scrubber, may be performed after contacting the gas with the catalyst. (column 2, lines 53-65; column 3, lines 48-59; column 4, lines 9-18; and column 5, lines 13-47). The acid removing scrubber would also perform the same function as a cooler because of the cooling nature of the spray in a scrubber. One of ordinary skill in the art would have recognized from the teachings of Rossin et al. that the location of the acid removal step (via scrubber means, which functions as a cooler) is on an "exhaust" side of the catalyst region used for the gas contacting process. Since the scrubber means is "downstream" of the catalyst region, one of ordinary skill in the art would readily arrange the scrubber means below the catalyst region, for the purpose of minimizing space that would normally be occupied by horizontally adjacent scrubber/catalyst region components of the processing apparatus, resulting in a more compact processing apparatus. Rossin et al. do not teach the use of a silicon component removal device.

However, Tom et al. teach a method of processing halocarbons in effluent gas streams from semiconductor processing. Tom et al. note that the presence of these materials and other contaminants cause problems for adsorption recovery/recycle systems because they cause clogging of void space in the adsorbent. To solve this, the

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process employs a contaminant removal means, such as a wet scrubber to remove contaminants such as SiCl_4 . Tom et al. also teach that more than one scrubber may be used in series and that check valves may be used to prevent back flow in the recovery/recycle process. (Tom et al.; column 3, lines 1-51; column 4, lines 7-26; column 5, lines 24-38; column 6, lines 62-67; and column 10, lines 13-18).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process of Rossin et al. by the teachings of Tom et al. One of ordinary skill would have been motivated to use a wet scrubber to remove contaminants from the gas stream, as taught by Tom et al., before contacting the gas stream with the catalyst bed. Further, it would have been obvious to one of ordinary skill in the art to place the heated catalyst and acid scrubber in a single body in order to save valuable floor space, rather than spacing the processes apart with conduits running in between.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591) as applied to claim 1 above, and further in view of Imamura (US 5,649,985) or Izumikawa et al. (US 6,022,489).

The former references teach and/or suggest the elements described above. However, these references do not teach the use of a heat exchanger.

Imamura and Izumikawa et al. teach the use of heat exchangers to exchange heat between gas that has exited a reactor and gas that is entering the reactor. (US 5,649,985; column 3, lines 10-15; and US 6,022,489; column 3, lines 20-23).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of Imamura or Izumikawa et al. One would have been motivated to use a heat exchanger to exchange heat between the hot catalytic exhaust gas and water that is being added before the catalyst in order to raise the water temperature and reduce the cost of heating the catalyst to the proper process temperature.

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591) as applied to claim 1 above, and further in view of Holst et al. (US 5,955,037).

The former references teach and/or suggest the elements described above. However, these references do not teach the structure of the wet scrubber inlet or the use of a diffusion portion in the wet scrubber.

Holst et al. teach a semiconductor scrubbing process in which the exhaust inlet to the wet scrubber extends into the scrubber at a position lower than the spray apparatus. The inlet opening is designed so that the top portion extends further than the bottom portion, causing an overhang. Holst et al. teach that this design allows for the effluent gas stream to be sheathed in a protective gas without premature contacting of the effluent gas with liquid. Holst et al. also teach the use of a demister pad to remove entrained water. (US 5,955,037; column 19, lines 36-67; column 20, lines 15-23; and Figure 10).

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of Holst et al. One would have been motivated to use an inlet with an overhang to allow an effluent gas stream to be sheathed in a protective gas without premature contacting of the effluent gas with liquid and to use a demister pad to remove entrained water, as taught by Holst et al.

7. Claims 2, 11, 12, 17-20, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin et al. (US 6,069,291) in view of Tom et al. (US 6,030,591) as applied to claims 1 and 15 above, and further in view of Smith et al. (US 5,417,934).

The former references teach and/or suggest the elements described above. However, these references do not teach the use of a removable catalyst cartridge or temperature sensors.

Smith et al. teach a heated catalyst that includes a heater surrounding a catalyst bed that is contained within a removable cartridge casing. A temperature controller is attached to the catalyst heater and temperature sensors are attached in upper and lower regions of the cartridge. (US 5,417,934; column 1, lines 10-24; column 2, lines 5-18; column 4, lines 22-23 and 30-40; and Figures 1 and 2). Smith et al. shows the cartridge being removed from the top of the reactor body in Figure 2. However, one of ordinary skill in the art would understand that the cartridge could also be removed from the bottom of the heater and that this might be advantageous when there are bulky conduits or equipment above the reactor.

It would have been obvious to one of ordinary skill in the art at the time that the applicants' invention was made to have modified the process described above by the teachings of Smith et al. One would have been motivated to do so in order to provide sensing means for the operation of a temperature controller and to provide a means for replacing the catalyst used in the reactor. One of ordinary skill in the art would use a detachable acid remover/cooler so it can be removed to gain access to the reactor and removable catalyst cartridge.

Response to Arguments

8. The examiner acknowledges the applicants' amendment and replacement drawing sheets, both of which were received by the USPTO on December 17, 2004. The replacement drawing sheets, when taken in combination with the amendments to the specification, overcome all prior objections to the drawings. The double patenting rejections have been rendered moot in view of the cancellation of all of the apparatus claims in the copending application. The applicants have added new independent claims 21-24. However, a claim objection to new claim 22 has been raised (see paragraph 1 above). Claims 1-24 are currently under consideration in the application.

9. Applicants' arguments filed December 17, 2004 have been fully considered but they are not persuasive.

With regard to the applicants' remarks/arguments on pages 19-25 of the applicants' amendment, the applicants' major argument focuses on the addition of the

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limitation that includes a cooling apparatus located below a catalyst layer, which has been set forth in all independent claims 1, 15, 17, 19, and 21-24. Addition of the limitation "below" does not make the applicants' claims unobvious over the prior art of record in paragraph 4 above, and the applicants are referred to the newly underlined portions of paragraph 4 above for details. However, it is noted that the applicants' remarks/arguments are persuasive with regard to the Seppanen et al. reference (non-analogous art), and all rejections based on Seppanen et al. have been withdrawn.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571)

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272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 2/27/05*
Examiner
Art Unit 1725

KPK
kpk
February 27, 2005